Claim Amendments

This listing of claims replaces all prior listings:

1. (Currently Amended) A method of IR correction for use in an ECMP cell having, within an electrolyte, at least a working electrode, a counter electrode, [[and]] a reference electrode adjacent to the working electrode, and a mechanical abrasion surface adjacent the working electrode, ~~wherein the voltage between the working and reference electrodes is maintained by a potentiostat having a controlled input and having its output modified by a current limiter,~~ the method comprising:

~~deriving a substantially square step function test signal by applying a small square step function voltage perturbation to the potentiostat input and clipping the current of the potentiostat output resulting from the application of the small square step function to the potentiostat input, using the current limiter, such that the clipped current is formed into a substantially square step function;~~

driving a polishing pad in at least one of a rotational and a lateral motion to provide mechanical polishing of a surface within the ECMP cell;

while driving the polishing pad, measuring a voltage transient between the reference electrode and the working electrode resulting from application of a [[the]] substantially square step function test signal to the ECMP cell;

deriving from the voltage transient a measure of the resistive impedance of the ECMP circuit between and including the working electrode and the reference electrode; and

subsequently using the measure of resistive impedance to derive an IR correction to the measured voltage between the working electrode and the reference electrode.

2. (Original) The method of claim 1, further comprising using the IR correction to produce a corrected voltage that represents the voltage across a substantially capacitive interface between the working electrode and the electrolyte.

3. (Cancelled)

4. (Original) The method of claim 1, wherein the step of deriving a measure of the resistive impedance of the ECMP circuit comprises converting the voltage transient to a digital

representation thereof and deriving from the digital representation a measure of the resistive impedance of the ECMP circuit.

5. (Currently Amended) The method according to claim 2, further comprising using the measure of resistive impedance to control the voltage between the working electrode and the reference electrode such that the voltage across the substantially capacitive interface between the working electrode and the electrolyte is controlled to ~~within a~~ substantially ~~small variance from~~ match a predetermined target value.

6. (Currently Amended) The method according to claim 5, wherein the voltage across the substantially capacitive interface between the working electrode and the electrolyte is controlled to be ~~substantially small variance is~~ less than about 10 mv.

7. (Original) The method according to claim 1, wherein the step of measuring a voltage transient between the reference electrode and the working electrode comprises measuring the voltage between the reference electrode and the working electrode prior to, during, and after the transient.

8. (Original) The method of claim 7, wherein measurements before and after the transient are taken with a lower temporal resolution than measurements taken during the transient.

9. (Original) The method of claim 7, wherein measurements before and after the transient are taken at substantially the same temporal resolution as measurements taken during the transient.

10. (Cancelled)

11. (Cancelled)

12. (Cancelled)

13. (Cancelled)

14. (Cancelled)

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Cancelled)

23. (Currently Amended) A method of IR correction for use in an electrochemical mechanical polishing cell having, within an electrolyte, at least a working electrode, a counter electrode, [[and]] a reference electrode adjacent to the working electrode, and a mechanical abrasion surface adjacent the working electrode~~, wherein the voltage between the working and reference electrodes is maintained by a potentiostat having a controlled input and having its output modified by a current limiter~~, the method comprising:

applying a substantially square step function test signal to the electrochemical cell~~, wherein the substantially square step function test signal is derived by applying a small square step function voltage perturbation to the potentiostat input and clipping the resulting current of the potentiostat output, using the current limiter, such that the clipped current is formed into a substantially square step function~~;

driving a polishing pad in at least one of a rotational and a lateral motion to provide mechanical polishing of a surface within the electrochemical cell;

while driving the polishing pad, measuring a voltage transient between the reference electrode and the working electrode resulting from the application of the test signal, the test signal having a start point, wherein the measurement of the voltage transient comprises measuring the voltage between the reference electrode and the working electrode at three times prior to the test signal start point and at three times subsequent to the test signal start point; deriving an extrapolated time-based voltage curve based on the measurements taken subsequent to the test signal start point;

deriving from the time-based voltage curve a measure of the resistive impedance of the electrochemical cell circuit between and including the working electrode and the reference electrode; and

subsequently using the measure of resistive impedance to derive an IR correction to the measured voltage between the working electrode and the reference electrode.

24. (Original) The method of claim 23, further comprising using the IR correction to produce a corrected voltage that represents the voltage across a substantially capacitive interface between the working electrode and the electrolyte.

25. (Cancelled)

26. (Currently Amended) The method according to claim 24, further comprising controlling the voltage between the working electrode and the reference electrode such that the voltage across the substantially capacitive interface between the working electrode and the electrolyte is controlled to ~~within a~~ substantially ~~small variance from~~ match a predetermined target value..

27. (Currently Amended) The method according to claim 26, wherein the voltage across the substantially capacitive interface between the working electrode and the electrolyte is controlled to be ~~substantially small variance is~~ less than about 10 mv.

28. (New) The method of claim 1, wherein the voltage between the working and reference electrodes is maintained by a potentiostat having a controlled input and having its output modified by a current limiter, wherein the method further comprises deriving the substantially square step function test signal by executing steps comprising: applying a small square step

function voltage perturbation to the potentiostat input; and clipping the current of the potentiostat output resulting from the application of the small square step function to the potentiostat input, using the current limiter, such that the clipped current is formed into a substantially square step function.

28. (New) The method of claim 23, wherein the voltage between the working and reference electrodes is maintained by a potentiostat having a controlled input and having its output modified by a current limiter, wherein the substantially square step function test signal is derived by executing steps comprising: applying a small square step function voltage perturbation to the potentiostat input; and clipping the current of the potentiostat output resulting from the application of the small square step function to the potentiostat input, using the current limiter, such that the clipped current is formed into a substantially square step function.